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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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LEONID BERESNEV

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KENYON & KENYON LLP
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER

NGUYEN, HOAN C

ART UNIT

PAPER NUMBER

2871

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/423,948	Applicant(s) BERESNEV ET AL.	
	Examiner HOAN C. NGUYEN	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 6-22 is/are allowed.
- 6) ☒ Claim(s) 23-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/16/2009 has been entered.

Claims 1-5 are cancelled. Claims 6-27 are pending.

In the article: "Nonlinearity of Panchanratnam's geometric phase in polarizing interferometers", Physical Review E, Volume 60, Number 2, pages 2322-2329 (August 1999), Bernhard Hils shows that there is ONLY reference Patent DE 19720246.2 (which was the Foreign Priority) published or filed before August 1999 for the claimed subject matter. Therefore, the amended independent claims 6, 12 and 17 are allowable.

However, the claim 23 has not amended with the allowed subject matter. Therefore, the rejection of claims 23-27 are repeated here.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 23-25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Lang (US3635552) provided in IDS.

In regard to claim 23, De Lang teaches (Fig. 1) a tunable interferometer for measuring an optical surface comprising:

- at least one light source 1;
- a reference surface 5, light from the at least one light source impinging the reference surface, the reference surface reflecting a first interference beams wherein the reference surface is stationary when at least one light source impinges the reference surface 5 (see attachment);
- a test object 12, light from the at least one light source impinging the test object, the test object reflecting a second interference beam (see attachment);
- at least one beam splitter 3, the first interference beam and the second interference beam striking the at least one beam splitter; and
- a polarizer 6 & 7 polarizing the first interference beam and the second interference beam so that the first interference beam and the second interference beam each have a different polarization state relative to one another; and

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- an analyzer, **including rotated analyzer 10, image field 11 and detectors 32-33**, positioned at an output of the interferometer, the analyzer having a variable polarization state (rotating), the analyzer tuning the interferometer as a function of the polarized first interference beam and the second interference beam, wherein depending on the polarization state of the analyzer, an additional phase inherently is introduced into at least one of the first and second interference beams of different polarizations so that an interference fringe pattern is displaced by a distance **from height of the object** (with electrical signals produced in detectors 32-33 having a phase difference equal the optical phase difference between beams 15 and 16; the col. 3 lines 19-27). **Height of the object is measured or detected by distance of a shift in the interference fringe pattern since different height cause the interference fringe pattern shift.**

wherein

Claim 24:

- the interferometer is a two-beam interferometer, wherein the light is a linearly polarized light and wherein the polarizer includes a first $\lambda/4$ retardation plate 7 allocated to the reference surface, and a second $\lambda/4$ retardation plate 6 positioned before the analyzer and after beam splitter to form a circular polarized light of the first and second interference beams.

Claim 25:

- the analyzer includes a rotatable linear analyzer (abstract and col. 3 lines 28-29).

Claim 27:

- the analyzer is arranged physically separate from the interferometer.

De Lang fails to disclose the interferometer of one embodiment according to Fig. 1 including the polarizer being disposed after the light source and before the beam splitter.

De Lang discloses the interferometer of another embodiment according to Fig. 4 including the polarizer 41 being disposed after the light source 40 and before the beam splitter 42.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a tunable interferometer as De Lang disclosed with the polarizer being disposed after the light source and before the beam splitter for converting the beam into linearly polarized light as another embodiment taught.

2. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over De Lang (US3635552) as applied to claims 6-8, 10-14 and 16, and in further view of Sharp et al. (US5627666).

De Lang fails to disclose the interferometer having the analyzer including an electrically tunable liquid-crystal element with a linear polarizer.

Sharp et al. teach (Fig. 3) the interferometer (col. 2 lines 20-21) having the analyzer including an electrically tunable liquid-crystal element 10/20 with a linear polarizer 40.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a tunable interferometer as De Lang disclosed with the analyzer including an electrically tunable liquid-crystal element with a linear polarizer for increasing tuning range (col. 2 lines 35-46).

Allowable Subject Matter

Claim 6-22 are allowed. The following is an examiner's statement of reasons for allowance:

Claims 6, 12 and 17 are allowed since there is no prior art teaches a tunable interferometer for measuring an optical surface comprising:

- a reference surface, light from the at least one light source impinging the reference surface, the reference surface reflecting a first interference beam, wherein the reference surface is stationary when at least one light source impinges the reference surface;
- a test object, light from the at least one light source impinging the test object, the test object reflecting a second interference beam;
- at least one beam splitter, the first interference beam and the second interference beam striking the at least one beam splitter; and
- a polarizer polarizing the first interference beam and the second interference beam so that the first interference beam and the second interference beam each have a different polarization state relative to one another, the polarizer being disposed after the light source and before the beam splitter or the polarizer being

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situated between the light source and the beam splitter to form the polarized first and second interference beams;

- an analyzer positioned at an output of the interferometer, the analyzer having a variable polarization state, the analyzer tuning the interferometer as a function of the polarized first interference beam and the second interference beam,

wherein

- depending on the polarization state of the analyzer, an additional phase is introduced into the first and second interference beams of different polarizations so that an interference fringe pattern, imaging the test object, is displaced by a distance.
- the reference surface and test object are not displaced (not moveable) in order to effect the tuning of the interferometer.

Claims 7-11, 13-16, 18-22 are allowable since they depend on the allowed claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (571)272-2296. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HOAN C. NGUYEN
Primary Examiner
Art Unit 2871

Chn
/HOAN C. NGUYEN/
Primary Examiner, Art Unit 2871